PRE-FEASIBILITY REPORT AND DRAFT TERMS OF REFERENCE

OF

KALESHWARAM LIFT IRRIGATION SCHEME

FOR FILLING UP OF 14 MINOR IRRIGATION TANKS IN JAYASHANKAR BHOOPALPALLY DISTRICT, TELANGANA TO BENEFIT 18,211 HA OF COMMAND AREA

Submitted to

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JUNE 2017

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1. Executive Summary

Kaleshwaram LIS envisages lifting of 4.5 TMC of water from Godavari River to fill 14 Minor irrigation tanks in Mahadevpur Mandal, Jayashankar Bhoopalpally district and to benefit 18,211 Ha of command area under the MI tanks. Out of 4.5 TMC of water, the project also envisages supply of 0.3 TMC drinking water to the enroute villages. 64 villages belongs to 4 Mandals will be benefitted under the scheme.

The construction work involves intake canal, pumping stations, pressure main and gravity canals. The water will be lifting through pump house and with the help of pressure main (pipelines) and the water will be conveyed to tanks through pipelines buried underground. Gravity canal network will be constructed under each tank to convey the water to the fields. This is a flagship project of the Government in the drought prone areas and Naxal affected areas to improve the socio-economic conditions of the society. The project doesn't involve submergence and hence no Rehabilitation and Resettlement. The project requires diversion of 258.028 Ha of forest land for laying pipelines for which Stage-I Forest Clearance has been accorded by the Ministry.

According to EIA Notification, 2006 and its subsequent amendments, the project is a tank filling project. Hence, the project is categorized as 'A' and requires Environmental Clearance from MoEF, New Delhi.

The location of proposed intake is at longitude 79°56’22.3”E and latitude 18°46’40.3”N near Kannepally Village of Mahadevpura Taluk Jayashankar Bhoopalpally district. Total cost of the project is 499.23 Cr. The B – C Ratio as per CWC guidelines is works out to be 1.5.

2. Introduction of the Project/ Background Information

2.1 Identification of project proponent and project.

The new State of Telangana came into existence on 2nd June 2014 with 10 Districts from erstwhile State of Andhra Pradesh. In the process of achieving Golden Telangana, Irrigation & CAD Department of Telangana State is making every effort to harness and utilize all the available water resources for benefitting of Agricultural sector, Industrial Sector and also providing drinking water for overall development.

The development of Irrigation in Telangana is mostly dependent on Godavari & Krishna Rivers and their tributaries, Tanks & Ponds. Tanks are the most important resources of Telangana. There are 46,531 nos. of water bodies varying from very large tanks to small ponds & percolation tanks. Restoration & Renovation of tanks has been taken by I&CAD Department under 'Mission Kakatiya', a flagship programme of Government of Telangana at 20% tanks every year.

It is proposed to take up Kaleshwaram LIS which envisages lifting of 4.5 TMC of water from Godavari River near Kannepally village of Jayashankar Bhoopalpally District to fill 14 Minor Irrigation Tanks in Jayashankar Bhoopalpally District, Telangana to benefit the command of Minor irrigations tanks.

2.2 Brief description of nature of the project.

To accelerate the development of backward, naxal affected and drought prone areas, Telangana government has proposed to take up Kaleswaram Lift Irrigation scheme, by proposing an intake structure near Godavari river, Kannepally village, Mahadevpura taluk, Jayashankar Bhoopalpally district.

The scheme envisages lifting of 4.5 TMC of water for providing irrigation facilities for an ayacut of 18,211 Ha, in the upland areas to provide drinking water to enroute villages, which otherwise flows off to Bay of Bengal. List of tanks being benefited by the scheme is as follows:

Table – 1 List of MI tanks proposed for filling and their capacity

Sl. No.	Name of the tank	Name of the village	Ayacut (Ha.)	Capacity of tank (mcft)
1	Erra cheru	Mahadevpura	1266	15.95
2	Mandiram cheru	Bommapur	1644	54.21
3	Garepally tank	Garepally	766	10.5
4	Adivarampet tank	Adivarampet	1290	0.02
5	Gummalapalli cheruvu/ Ooracheruvu	Gummalapalli	1481	0.16
6	Veerapur Cheruvu	Veerapur	1640	38.96
7	Gudur/ Peddacheruvu	Gudur	1417	11.981
8	Thanda cheruvu	Kothapalli	1012	0.09
9	Yellapur tank	Mulugupally	1764	14.83
10	Polaram cheru	Polaram	1730	168.87
11	Kothapalli cheruvu	Kothapalli	931	0.1
12	Rudraram Cheruvu/ Ooracheruvu	Rudraram	1822	312.63
13	Dhanwad/ Ooracheruvu	Dhanwada	891	22.25
14	New tank	Garepally	823	--

As per the National Water Policy, highest priority has to be given for drinking water. Hence, the proposed Kaleswaram scheme aims at providing drinking water to the villages. Out of 4.5 TMC, 0.5 TMC of water is utilized for drinking purpose to enroute the villages. There are 63 villages in 4 mandals falling in the command area. Mandal wise population along with drinking water requirement is given in table below;

Table – 2 List of villages for drinking water supply

Sl. No.	Mandal	Population	Drinking water requirement (lpcd)
1	Mahadevpura	35,319	22,95,735
2	Kataram	31,130	20,23,450
3	Mahamutharam	23,327	15,16,255
4	Mallahr	23,764	15,80,100
	Total	1,13,540	74,15,540

Red soil is predominant the project zone, which includes chalkas, red sand and deep red loamy. Very deep black cotton soil was found in some parts of the command. The command area map of proposed LIS is given below.

2.3 Need for the project and its importance to the country and or region.

The entire district area falls under Agro climatic zone IV i.e., Northern Telangana Zone. This region receives an annual rainfall between 900 - 1150 mm, mostly Southwest monsoon. Maximum and minimum temperature recorded range from 30°C to 37°C and 32°C to 42°C respectively.

In this zone the rainfall is uncertain, uneven and sparsely distributed. The type of soils red loamy sand, red sandy loam, deep red soil, Laterite soil, deep black soil etc., Proposed command area taluk is severely prone to erratic droughts due to lack of south-west monsoon.

2.4 Demand-Supply

Through supply of 4.5 TMC of water from Godavari river near Kannepally village an area of 18,211 Ha can be benefitted by filling up 14 MI tanks and this in turn leads to higher productivity and better yield. Out of 4.5 TMC about 0.3 TMC of water is used for drinking water purpose to benefit 63 villages in 4 mandal that comes under the command area.

2.5 Imports vs. Indigenous production

By implementation of the proposed project improvement in crop cultivation can be achieved.

2.6. Export possibility

This project may ultimately lead to export of excess food grains.

2.7. Domestic/ Export markets.

The project produce will have favorable impact on domestic and export markets.

2.8. Employment Generation (Direct and Indirect) due to the project.

Around 250 people (50 Technical and 200 construction labourers) are expected to be employed temporarily for the construction work of jack well cum pump house, raising main, delivery chamber, canal system and distribution network. During operation phase labourers will be appointed for operation and maintenance of the pump house.

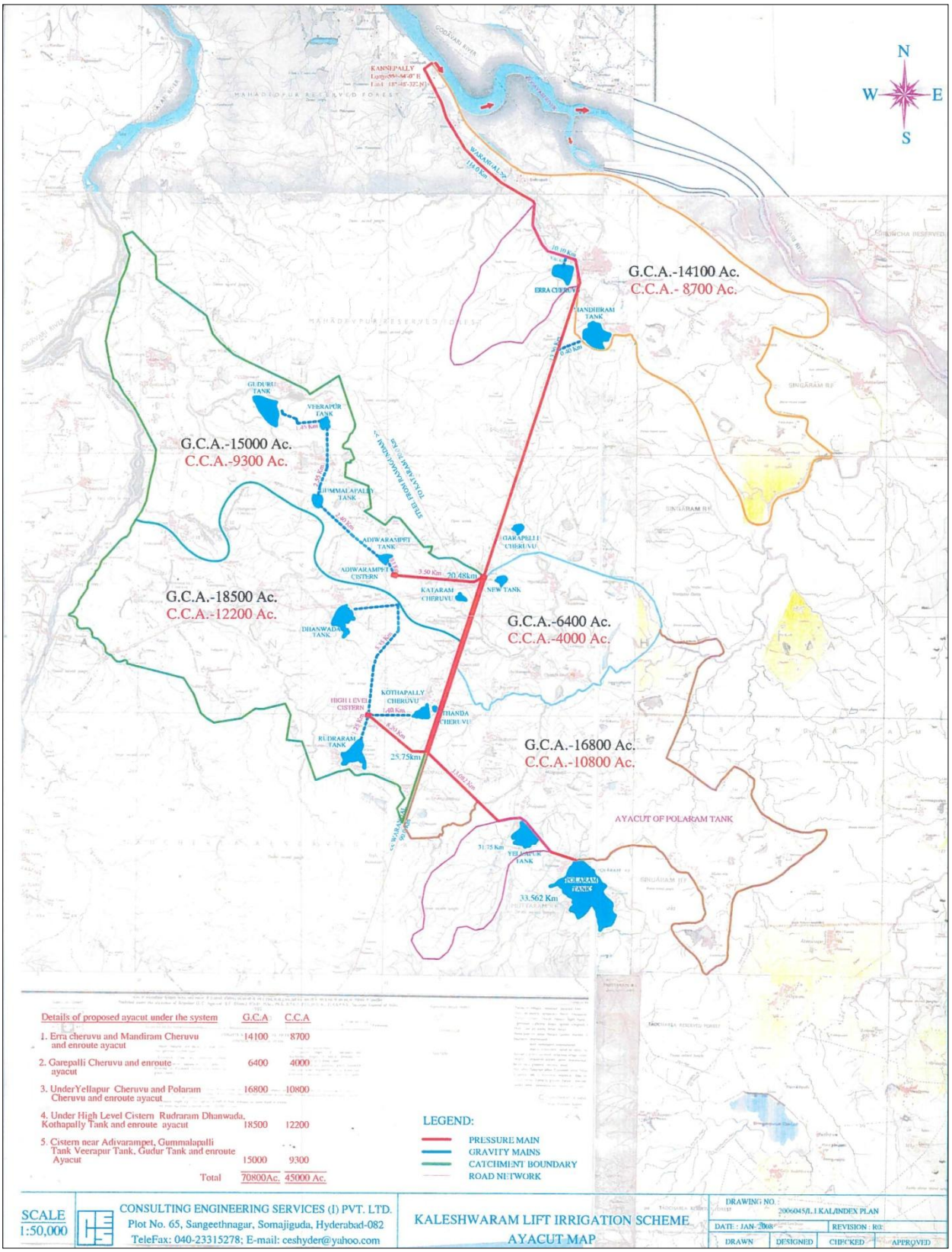


Fig.2.1 Command area map

3. Project Description

3.1. Type of project including interlinked and interdependent project, if any.

The Command area of proposed project is >10,000 Ha, according to EIA Notification, 2006 and its subsequent amendments, the project is a tank filling project benefitting 18,211 ha of command area. Hence, the project is categorized as 'A' and requires Environmental Clearance from MoEF, New Delhi.

3.2. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.

The proposed project is situated near Kannepally village in Mahadevpura Taluk, Jayashankar Bhoopalpally District, Telangana. Intake (pump house-I) is located at 18°46'40.3"N and 79°56'22.3"E. Location map of the project is shown in Fig.3.1

3.3. Details of alternative sites, considered and the basis of selecting the proposed site particularly the environmental considerations gone into should be highlighted.

Not applicable

3.4. Size & magnitude of operation

The scheme envisages lifting of 4.5 TMC of water from the Godavari River near Kannepally village, Mahadevpura Taluk, Jayashankar Bhoopalpally district to fill 14 Minor Irrigation Tanks to benefit the command area of 18,211 ha coming under these tanks.

3.5. Project description with process details (a schematic diagram/flow chart showing the project layout, components of the project etc) should be given.

The project comprises of major components which are listed below:

- Lift and pressure mains from pumping station no.1 to pumping station no.2
- Lift and pressure mains to cistern at Adhiwarampet, Polaram tank and High level cistern near Rudraram village.
- Gravity canal from high level cistern to Oiracheruvu, Rudraram and Dhanwad villages.

- Gravity canal from cistern at Adhiwarampet to Peddacheruvu/ Guddur tank.
- EIA/ EMP report and R&R plan if applicable.

The flow diagram of main canals is given as fig 3.2, and the lead chart is given as fig 3.3.

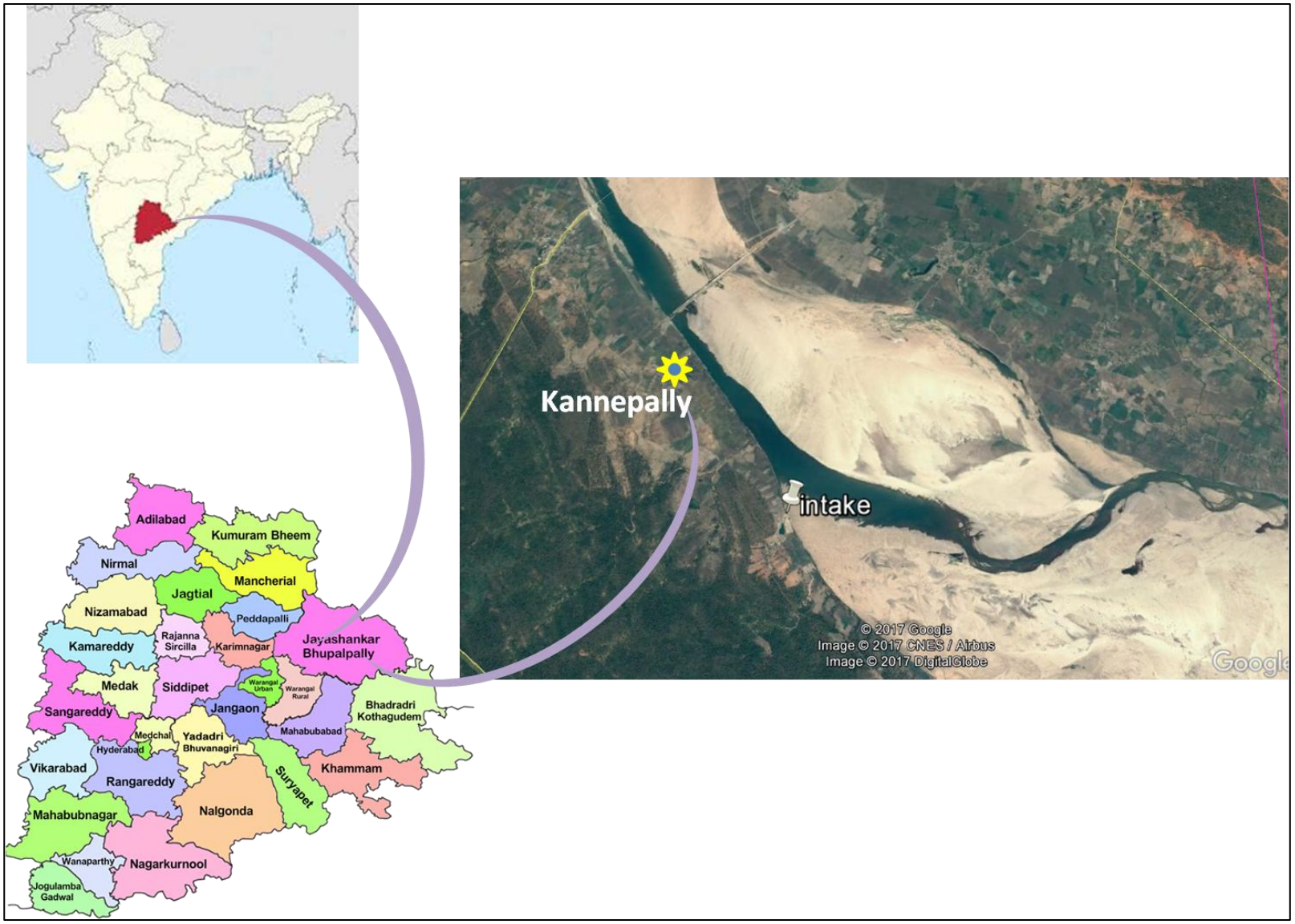


Fig.3.1 Location map of proposed project

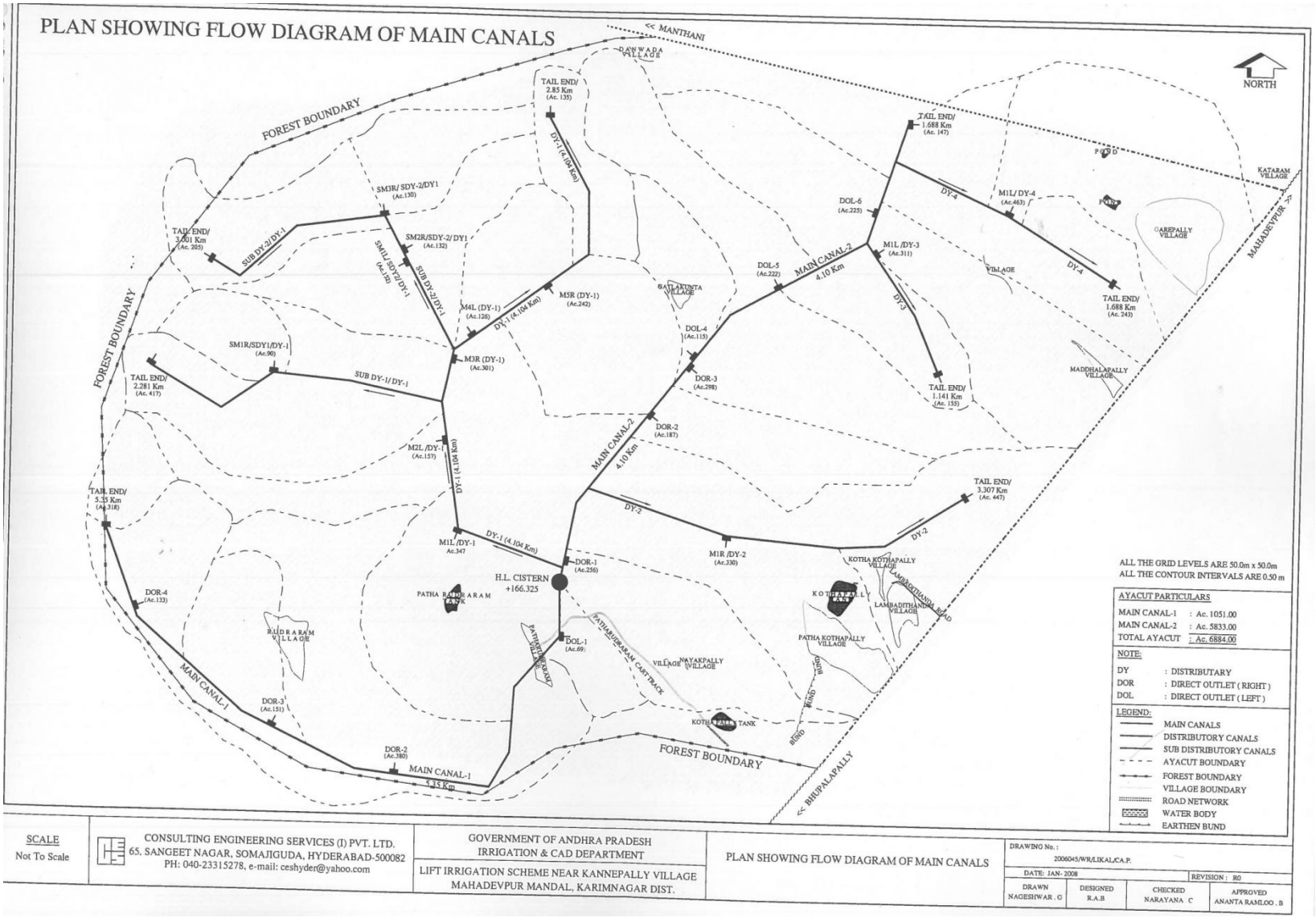


Fig.3.2 Flow diagram of main canals

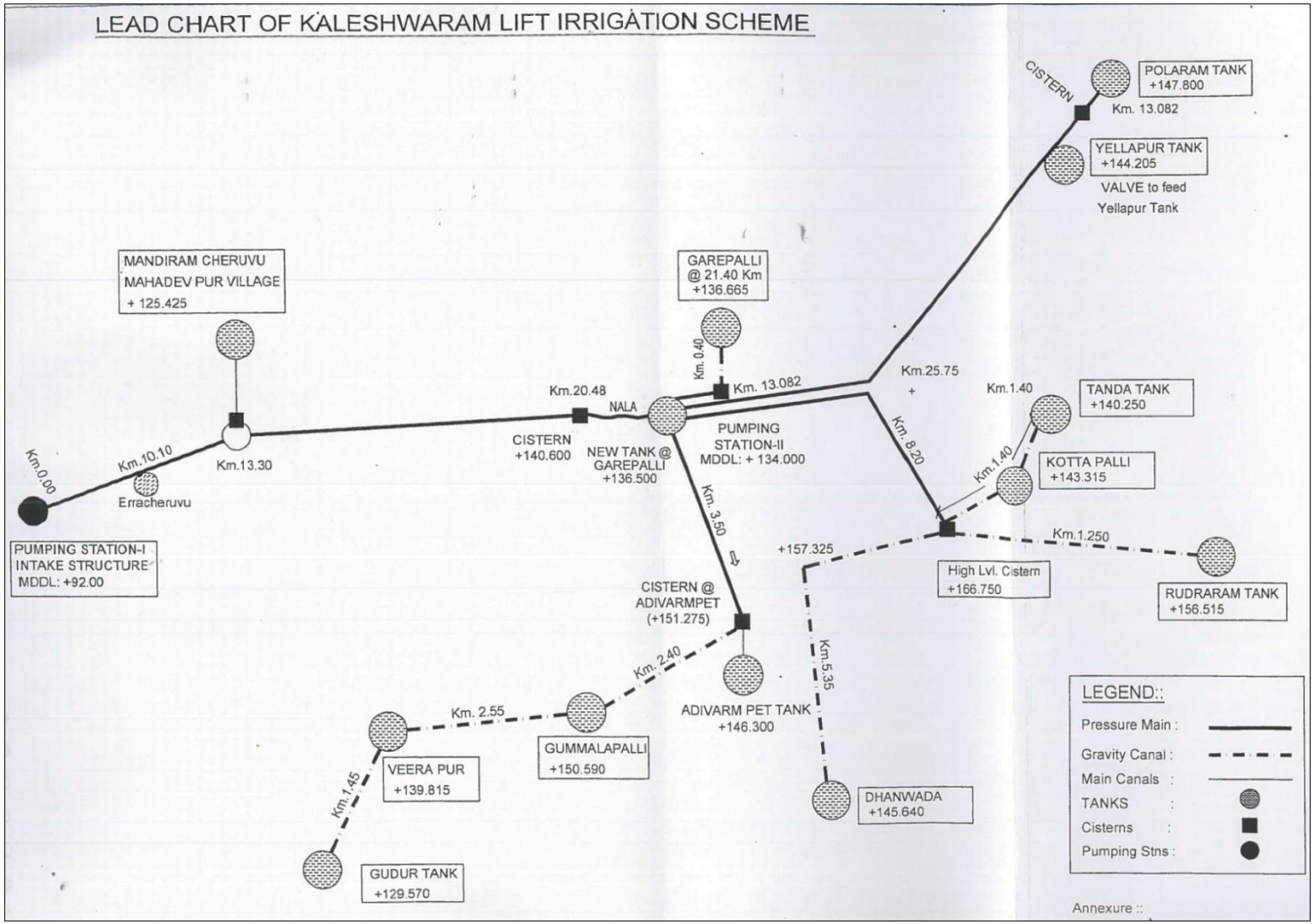


Fig.3.3 Lead Chart of proposed project

3.6. Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished products.

Table – 3 List of construction material required for the construction purpose and there source

Sl. No.	Construction material	Source
1	Cement	Oriental cement factory located at Basantpur (110 km from proposed site)
2	Reinforcement steel	Ramagundam railway yard
3	Structural steel	Ramagundam railway station
4	Sand	Bed of Godavari river
5	Coarse/ Fine aggregate	Warangal quarry
6	Revetment stone	Warangal quarry
7	Pozolona	Ramagundam super thermal station

Table – 4 Quantification of major items for construction activities

Sl. No.	Construction material	Quantity Cum^3		
		C1	C2	C3
1	Earthwork	189600 207300	50164	75320
2	CC M-10	2096 +100	370	2970
3	CC M-15	855	865	5670
4	CC M-20	15009	34	--
5	Steel (M.T)	1440	3	--
6	Rought stone dry packing	5449	178	--
7	Brick masonry work in CM (1:5)	376	--	--
8	Plastering in CM (1:5)	3285	--	--
9	Stop log gates	8 nos.	--	--
10	Trash rock gates	8 nos.	--	--
11	Rolling shutters	3 nos.	--	270 nos.

3.7. Resource optimization/recycling and reuse envisaged in the project, if any, should be briefly outlined.

Resource Optimization / recycling and reuse is not envisaged in this project, however depending on the suitability of the soil, the excavated soil will be used for bund construction, laying of service roads as well as for green belt development. Construction site would be

properly leveled. The leveling will be made mandatory for the contractor, involved in the construction.

3.8. Availability of water, its source, Energy/ Power requirement & source water requirement

The inflows as obtained at the proposed site are taken to be representative of the river flows at intake which is about 5 km downstream of Kaleswaram site as there is no tributary inflows or outflows in the intervening reach. Based on the approach as described before, the divertible flows at intake point have been worked out for the present scenario for each year of record. Availability of occasional surpluses during Jan-May is ignored. Overall annual quantum of divertible water taking first sharp recession as cut off point works out to be 4.02 TMC of irrigation and 0.3 TMC for drinking water. The yield, allocations and balance water availability is given below:

Table – 5 Water yield availability at river Godavari and their utilization

Sl. No.	Sub – basin	75 % dependability		
		Yield of sub-basin (TMC)	Utilization (TMC)	Balance share (TMC)
1	Middle Godavari	302.14	260.3	41.84
2	Penganga	42.40	10.56	31.83
3	Wardha	19.63	0.9	18.73
4	Pranahita	283.4	30.77	262.63

It is proposed to lift 4.5 TMC of water from the Godavari River near Kannepally village, Mahadevpura Taluk, Jayashankar Bhoopalpally district to fill 14 Minor Irrigation Tanks to benefit the command area of 18,211 ha coming under these tanks. Table showing 75% dependable yield for river Godavari is given below.

3.8.1 Power Requirement

28.17 MW, Source: TSNPDCL.

Table – 6 Supply and demand matching for a 75% Dependable Hypothetical year 1986

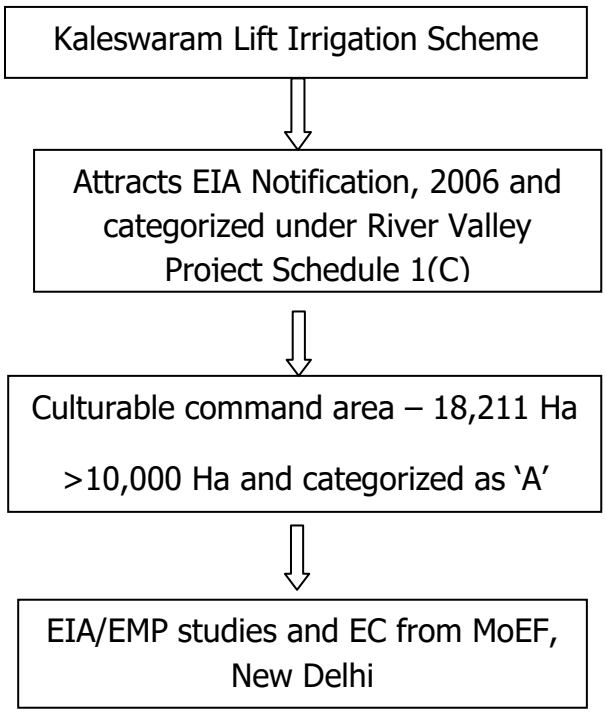
Sl. No	10 Daily Serials	Observed Flows in the river (in cumecs)	Gross irrgn. water requirement (in cumecs)	Drinking water requirement (in cumecs)	Total water demand at site	Water Demand including losses		Balance Demand
						15% Transport action	15% field losses	Col. (3-8)
1	2	3	4	5	6	7	8	9
1	July							
	D 1-10	11757	1.74	0.09	1.83	2.43	3.24	Nil
	D 11-20	2185	5.01	0.09	5.10	6.80	9.07	Nil
	R Days	13517	12.74	0.09	12.83	17.10	22.80	Nil
2	August							
	D 1-10	1816	2.44	0.09	2.53	3.37	4.5	Nil
	D 11-20	29765	2.93	0.09	3.02	4.03	5.37	Nil
	R Days	3286	3.8	0.09	3.89	5.19	6.9	Nil
3	September							
	D 1-10	497	3.92	0.09	4.01	5.35	7.13	Nil
	D 11-20	919	4.50	0.09	4.59	6.12	8.16	Nil
	R Days	852	4.58	0.09	4.67	6.23	8.30	Nil
4	October							
	D 1-10	1158	4.22	0.09	4.31	5.75	7.66	Nil
	D 11-20	751	3.69	0.09	3.78	6.68	8.90	Nil
	R Days	316	4.92	0.09	5.01	5.04	6.72	Nil
5	November							
	D 1-10	247	6.78	0.09	6.87	9.16	12.21	Nil
	D 11-20	300	3.27	0.09	3.36	4.48	5.97	Nil
	R Days	312	0.65	0.09	0.74	0.98	1.32	Nil

3.9. Quantity of wastes generated (liquid and solid) and scheme for their Management/disposal.

Sewage generated from the labour camps will be treated in septic tank and soak pits that will be designed and constructed as per IS 2470 Part-I and Part-II. Domestic solid wastes proposed to be generated from labour camps will be disposed to nearby Municipal authorities.

Total water consumption is 12 KLD for labor camps, wastewater generated is 80% of total water consumption i.e., 9.6 KLD. Total solid waste generated from 250 labors is 62.5 kg/D.

3.10. Schematic representations of the feasibility drawing which give information of EIA purpose



4. Site Analysis

4.1. Connectivity

The project site (Head works) is approachable by Hyderabad Mancherial road the lift point near Kannepally village is at the distance of 39 km from Bhoopalpally headquarters. The nearest railway station is Peddapally railway station- 70 km and nearest airport of Ramagundam airport which is at a distance of 70 kms. NH 16 is the nearest National Highway which serves as main approach of transportation.

4.2. Land form, land use and land ownership.

The land use in the proposed project area is deep black cotton soil, deep red soil, Laterite soil and medium black soil. Commonly grown crops in the region are paddy, Jowar, maize, Green, red and Bengal grams. Land use pattern of the district is given below:

Table – 7 Land use of Bhoopalpally district

Sl.No.	Category	Area in Ha.
1	Forest	250410
2	Barren and uncultivable land	83834
3	Non – agricultural land	80475
4	Cultivable waste	19234
5	Permanent pastures and other grazing lands	54852
6	Misc. tree crops and groves	7131
7	Other fallow lands	53143
8	Current fallow	306425
9	Net area sown	332992
10	Geographical area	1188499

4.3. Topography (along with map)

The interior of the basin is a plateau divided into a series of valleys sloping generally towards East. The Eastern Ghats which form the eastern boundary of peninsula are by no means so well define or continues as the Sahyadri range on the west. They rise from the plains and East Godavari and Vishakhapatnam to the level of table land.

4.4. Environmental Sensitivity

The proposed project requires 258.028 Ha of forest land, there are no wildlife sanctuaries or national parks within 10 km radius. Sivaram Wildlife Sanctuary is located at a distance

of 10 Km from the boundary of command area. Google view of the same is given in figure 4.1

4.5. Existing Infrastructure

Project head works is approachable by Hyderabad Mancherial road, and also by other service roads.

4.6. Soil Classification

Red soil is predominant in this region which includes chalkas, red sandy and deep red loamy soil. Very deep black cotton soil is also seen in some parts of the zone. Deep and moderately well drained cracking clayey and calcareous soils are located seen near valley.

4.7. Climatic data from secondary sources

The proposed command area falls under Agro – Climatic zone IV i.e., North Telangana Zone with an annual average rainfall ranging from 900 – 1150 mm, mostly received during southwest monsoon.

During summer the period of sunshine is more than 8 hours, whereas during rainy the availability of sunshine is about 5 hrs. However it is observed that the rainfall is erratic and cannot be depended for irrigation purpose.

4.8. Social Infrastructure available

In the close proximity of the project site, educational, religious and transportation facilities are found. The habitants have a good transportation facility as these are accessible easily. There is good number of educational institutes like Government College and Adarsha educational institute. Overall it is clearly seen that the social infrastructure in and around the project site is of a good standard.

5. Planning

5.1. Planning concept (type of industries, facilities, transportation, etc.,) Town and Country Planning Development authority classification.

Transportation facility is approachable through Hyderabad Mancherial road, and also by other service roads. There are 14 MI tanks which come under the domain of this project and the list is given below:

Sl. No.	Name of the tank	Name of the village
1	Erra cheru	Mahadevpura
2	Madiram cheru	Bommapur
3	Garepally tank	Garepally
4	Adivarampet tank	Adivarampet
5	Gummalapalli cheruvu	Gummalapalli
6	Veerapur Cheruvu	Veerapur
7	Peddacheruvu	Gudur
8	Thanda cheruvu	Kothapalli
9	Yellapur tank	Mulugupally
10	Polaram cheru	Polaram
11	Kothapalli cheruvu	Kothapalli
12	Rudraram Cheruvu	Rudraram
13	Ooracheruvu	Dhanwada
14	New tank	Garepally

5.2. Population Projection.

Influx of labourers will be only during construction phase, only few people will be employed for operation and maintenance of the project.

5.3. Land use planning (breakup along with green belt etc.)

No changes are intended in land use as the proposed project will benefit the command by filling MI tanks.

5.4. Assessment of Infrastructure Demand (Physical & Social).

Kaleshwaram LIS envisages lifting of 4.5 TMC of water from Godavari River near Kannepally village of Jayashankar Bhoopalpally District to fill 14 Minor Irrigation Tanks in Jayashankar Bhoopalpally District, Telangana to benefit the command area of 18,211 ha coming under these tanks.

5.5. Amenities/facilities

Proper site services such as First Aid, Canteen / Rest Shelter, Drinking Water will be provided to the construction workers. Various facilities to be provided during construction and operation of the project are as follows:

- Electricity shall be provided by transmission lines and DG sets.
- Drinking water will be provided to the workers by tankers during construction.
- To provide the first aid for any sort of injuries encountered during the operation, one first aid room shall be provided. First aid kit and sufficient stock of material / medicines needed for first aid shall be provided as per requirement.
- In future if women workers are employed, arrangement for a crèche shall be made as per the requirement.
- Necessary arrangement shall be made for conducting refresher course as laid down in vocational training rules to upgrade skills of the persons involved in the project.
- Construction workers engaged in forest areas of the project will be provided.
- LPG/Kerosene for cooking purpose to prevent possible tree felling in forest areas.

6. Proposed Infrastructure

6.1. Industrial Area (Processing area)

Not applicable

6.2. Residential Area (non processing area)

Not applicable

6.3. Green Belt

By filling of 14 MI tanks in ayacut area irrigation stability can be achieved.

6.4. Social Infrastructure

There is good number of educational institutes like Government College and Adarsha educational institute, hospitals, etc are available in the region. Overall, it is clearly seen that the social infrastructure in and around the project site is of a good standard.

6.5. Connectivity Traffic and Transportation Road/Rail/Metro/Water ways etc.,

The project site (Head works) is approachable by Hyderabad Mancherial road and the lift point near Kaladagi village is at the distance of 7 km from Mahadevpur.

6.6. Sewerage System

Sewage generated from the labour camps is proposed to be treated in Septic Tank and Soak Pits designed and constructed as per IS 2470 Part-I & Part-II.

6.7. Industrial waste management

Not Applicable

6.8. Solid waste management

Domestic solid waste will be handover to municipal authorities.

6.9. Power requirement & Supply/Source

28.17 MW, Source: TSNPDCL

7. Rehabilitation and Resettlement (R&R) Plan

7.1. Policy to be adopted (Central/State) in respect of the project affected persons including home ouster, land ouster, and landless labourers (a brief outline to be given).

The proposed project does not involve displacement of the families/houses for the project activities. The total land required for the project is 1716 Ha of which 1457 Ha is non forest land and 259 Ha is forest land. Land shall be acquired as per Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act (RTFC&LARR Act), 2013. The forest land will be acquired as per the Forest (Conservation) Act, 1980.

8. Project Schedule & Cost Estimation

8.1. Project Schedule

The total developmental period of the entire proposed project will be about 2 years.

8.2. Cost Estimates

The total cost estimated for the proposed project is Rs 499.23 Crores.

9. Analysis of proposal (Final recommendation)

9.1. Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area

BC Ratio of the project is 1.5**.**

10. Draft Terms of Reference (TOR's)

10.1 Study Area

Kaleshwaram LIS envisages lifting of 4.5 TMC of water from Godavari River near Kannepally village of Jayashankar Bhoopalpally District to fill 14 Minor Irrigation Tanks in Jayashankar Bhoopalpally District, Telangana to benefit the command area of 18,211 ha coming under these tanks.

10.2 Environmental Monitoring/Baseline study

- Soil Quality sampling stations - 7 locations
- Water Quality sampling stations - 5 Locations (Surface Water-2 & Ground Water-3)
- Air Quality Sampling Stations - 3 Locations
- Noise Quality Sampling Stations - 3 Locations

10.2.1 Draft Terms of Reference (TOR's) Proposed to be covered in EIA/EMP Report

A) Baseline Environmental Studies

- The baseline environmental studies will be conducted in one season.

B) Study area

- Command area
- 10 Km radius of main project components

(a) Physico-Chemical Environment

- Physical geography, Topography, Regional Geology and presence of mineral deposits, if any in the study area.
- Meteorological monitoring data (Temperature, rainfall, RH, wind speed, wind direction, etc) from Nearest IMD station and also establishing micro meteorological station at the project site.
- Ambient air quality parameters such as Particulate Matter (PM_{10}, $PM_{2.5}$), Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_2) for the study area at 2 stations.
- Existing Noise Levels in the study area at 2 stations.
- Soil studies considering irrigation component of the project: includes Soil Quality

analysis for Physico-Chemical parameters (viz. Soil Type, Texture, Porosity, Permeability, Hydraulic conductivity, Water Holding Capacity, Bulk Density, Moisture, pH, Electrical Conductivity, Magnesium, Calcium, Total Alkalinity, Chlorides, Sodium, Potassium, Organic Carbon, Available Potassium, Phosphorus, Available Phosphorus, SAR, Nitrogen, Nitrates, Nitrites, Salinity, Available nitrogen, Zinc, Boron, Lead, Manganese, Iron, Nickel, Barium, Copper, Hexavalent Chromium, Cadmium and Mercury) in the study area at 7 locations.

- Physical, Chemical and Bacteriological parameters of water quality (both surface and ground water) such as pH, Electrical Conductivity, Total Dissolved Solids (TDS), DO, Turbidity, Alkalinity, Ca, Mg, Total Hardness, Chlorides, Iron, Fluorides, Phosphates, Sulphate, Nitrates, Sodium, Potassium and Bacteriological parameters comprises of Faecal and Total Coliform at 5 locations (2 surface water and 3 ground water).
- Water use and existing projects upstream and downstream.
- History of groundwater table fluctuation in the Command Area.
- Command Area Development plan.
- Method of sewage and solid waste disposal in labour camps and in staff colony.
- Land use and land cover analysis using remote sensing data, drainage, terrain, contour maps and soil map.

(b) Biological Environment

- Characterization of forest types in the study area, if any and extent of each forest type.
- General vegetation pattern and floral diversity.
- Economically important species viz. non-wood forest producing species, including medicinal plants, timber, fuel wood etc.
- Categorization of Flora/Fauna using International Union for the Conservation of Nature and Natural Resources (IUCN) Red list Status
- Cropping and Horticulture pattern and practices in the study area.
- Birds (resident, migratory), Land animals including reptiles, amphibians, fishes and insects in the study area.
- Details of endemic species found in the project area/study.
- RET flora species will be classified as per IUCN Red Data list, 2017. Details of endemic

species will be provided.

- RET fauna species will be classified as per IUCN Red Data list, 2017. Details of endemic species will be provided.
- Aquatic Ecological study of Godavari River including documentation of status of fishes, zoo and Phyto plankton, benthos etc.

(c) Environmental Impact Assessment (Impact Identification and Prediction)

The impacts that will be assessed on various components of the environment during construction and operational stage of the proposed project will be given under the following headings:

1) Land Environment

- Immigration of labour population.
- Muck generation and disposal
- Operation of construction equipment
- Construction of roads, etc.
- Acquisition of Land
- Seismicity
- Inundation of land
- Change in land use pattern and topography etc.,
- Impact on Soil and Water environment of proposed Command Area.

2) Water Environment

- From labour camps/colony
- From equipments washings
- Change in hydraulic regime and downstream flow
- Impact on downstream users and environmental flows
- Water pollution due to disposal of sewage
- Impacts on river water quality

3) Terrestrial Flora

- Pressure on existing natural resource
- Loss of floral diversity

4) Terrestrial Fauna

- Disturbance to Wildlife, if any.
- Impacts on Avian-Fauna, if any.

5) Aquatic Ecology

- Impacts on aquatic ecosystem and biodiversity
- Impact on fish fauna
- Fish population
- Change in aquatic diversity

6) Noise Environment

- Anticipated Increase in Noise Levels during construction
- Impact of noise levels on hearing
- Effect on fauna and human health

7) Air Environment

- Pollution due to fuel combustion in equipments
- Pollution due to fuel combustion in vehicles
- Effects on human health
- Dust pollution
- Impact of emissions from DG sets used for construction on air environment.
- Fugitive emissions from various sources

8) Socio Economic Environment

- Impact of the socio-economic status
- Impact on yield of crops due to irrigation
- Impact on human health due to water/vector borne disease
- Impact on the local community including demographic changes

9) Public Health Environment

- Impacts on Occupational Health and status.
- Endemic disease
- Human waste disposal
- Sewage Disposal

d) Environmental Impact Evaluation

Environmental Impact Analysis/Evaluation during construction and operation phases of the proposed project will be carried out adopting matrix system considering impacts without EMP and with EMP aspects.

e) Environmental Management Plan (EMP)

Environmental Management Plan (EMP) aims at minimizing the negative impacts of the proposed project on the surrounding environment. The mitigation measures for all the likely adverse impacts on the environment due to activities of the project will be given under the various following headings:

- Air Quality Management Plan
- Water Quality Management Plan
- Noise Level Management Plan
- Environmental safeguards (management) during construction activities
- Muck Disposal Plan
- Management to arrest salinity/ alkalinity in the wake of irrigation
- Command Area Development Plan
- Ground water management Plan.
- Public Health Management Plan
- Subsidized Fuel Management Plan
- Greenbelt Development Plan
- Environmental Monitoring Programme (With physical & financial details covering all the aspects of EMP i.e., budgetary allocation estimated for EMP will be included).

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